CYCAD HOST PLANTS FOR *LILIOCERIS NIGRIPES* (FABRICIUS) (COLEOPTERA: CHRYSOMELIDAE) AND *THECLINESTHES ONYCHA* (HEWITSON) (LEPIDOPTERA: LYCAENIDAE)

P.I. FORSTER[1] and P.J. MACHIN[2]

[1]*Queensland Herbarium, Queensland Department of Environment & Heritage, Meiers Road, Indooroopilly, Qld, 4068*

[2]*111 Dorrington Drive, Ashgrove, Qld, 4060*

Abstract

Cycad host plants in the Cycadaceae, Stangeriaceae and Zamiaceae for *Theclinesthes onycha* and *Lilioceris nigripes* are reviewed. New host records for both are presented.

Introduction

Larvae of both the lycaenid butterfly *Theclinesthes onycha* and the chrysomelid beetle *Lilioceris nigripes* feed on the young expanding foliage of cycads. An apparent complex mutualism occurs between both these species and several species of attendant ants (Wilson 1993). Despite this interesting interaction and their conspicuous larvae, little is known about the host range of either the butterfly (Common and Waterhouse 1981) or the beetle (Monteith 1991; Hawkeswood 1992; Wilson 1993). Most of the previous host plant identifications are imprecise or now superseded in the light of recent advances in Australian cycad systematics (Jones 1993). In this note we review the host plants of these two taxa, providing correct identifications of previous imprecise or incorrect determinations, as well as several new records.

This review (see Table 1) is based on the insect holdings at the Australian Museum, Sydney (AM), Queensland Department of Primary Industries, Indooroopilly (QDPI), Queensland Museum (QM) and Entomology Department, University of Queensland (UQIC), previously published work and our own observations of the insects in habitat and in rearing boxes. Some previous host records (e.g. *Macrozamia lucida* at Kuranda (Sibatani & Grund 1978)) are discounted due to apparent misidentifications or the uncertainty of unvouchered records from outside the natural range of the cited host. Cycad systematics follows Forster (1994), Jones (1993), Jones (unpublished data) and Stevenson (1992).

Observations

Larvae of *T. onycha* were collected near Inverell and in the Pilliga Scrub, N.S.W. and subsequently fed young fronds of *Macrozamia lucida* from Mt Glorious or from the species that they occurred on in habitat (specimens deposited in UQIC). *T. onycha* occurs from the tip of Cape York Peninsula in Queensland south to Tilba, N.S.W. and is also known from a single Northern Territory record at Darwin (Dunn and Dunn 1991).

Larvae of *L. nigripes* were collected near Bundarra and in the Pilliga Scrub and subsequently fed young fronds of *M. lucida*. Adults of *L. nigripes* were collected at several localities in N.S.W. and south-eastern Queensland

Table 1. Cycad food plants for *Lilioceris nigripes* (Coleoptera: Chrysomelidae) and *Theclinisthes onycha* (Lepidoptera: Lycaenidae).

LN = *Lilioceris nigripes*; TOO = *Theclinesthes onchya onycha*; TOC = *T. onycha capricornia*

+ indicates new host identification where previously imprecise

* indicates new record; # indicates putative record only, based on insect locality data and the cycad species that occurs in the area

[a] indicates adult record; l indicates larval record

Cycad	Insect	Source
CYCADACEAE		
Cycas		
1. *media*	LN^{+a}	Mareeba (Hawkeswood 1992)
	TOC^{*a}	Ingham (T. Lambkin in QDPI)
	TOC$^{\#}$	Hopevale (G. Monteith in QM)
2. *megacarpa*	TOC$^{\#}$	Kroombit Tops (G. Monteith in QM)
3. *ophiolitica*	TOC^{+}	Rockhampton (Sibatani & Grund 1978)
	LN^{+a}	Rockhampton (Hawkeswood 1992)
	LN^{al},TOC^{al}	Rockhampton (Wilson 1993)
4. sp. (Cape York) (ex "*Cycas media* grove")	TOC$^{\#}$	N of Moreton, Cape York Peninsula (Sibatani & Grund 1978)
STANGERIACEAE		
Bowenia		
1. *spectabilis*	LN^{a}	Kirrama & Cardwell Range (Monteith 1991)
	LN^{a}	Mossman (Hawkeswood 1992)
ZAMIACEAE		
Macrozamia		
1. *communis*	TOO^{l}	Depot Beach (Sibatani & Grund 1978)
2. *conferta*	LN^{*a}	near Warwick (this paper)
3. *lucida*	LN^{*l},TOO^{*l}	Mt Glorious (this paper)
4. *heteromera*	LN^{*a}	Warrumbungles (this paper)
5. *moorei*	TOC$^{\#}$	Mt Moffatt (G. Monteith in QM)
6. *pauli-guilielmi*	TOC^{*al}	Cooloola (T. Lambkin in QDPI)
7. *secunda* (tentative id.)	LN*a	Coolamon (AM records) (ex "*Xamia palms*")
8. *spiralis*	TOO^{l}	Newport (Sibatani & Grund 1978)
9. *stenomera*	TOO$^{+\#}$	Mt Kaputar (Common & Waterhouse 1981)
10. *viridis*	TOO$^{+\#}$	Stanthorpe (Common & Waterhouse 1981)
11. sp. (Bundarra)	LN^{*al}	Bundarra (this paper)
12. sp. (Inverell)	TOO^{*a}	Inverell (this paper)
13. sp. (Southern Pilliga)	LN^{*a}	Pilliga Scrub (this paper)
14. sp. (Northern Pilliga)	LN^{*al},TOO^{*l}	Pilliga Scrub (this paper)

(specimens deposited in UQIC and AM). Larvae grew to the final instar on leaf material of *M. lucida*, but then escaped. *L. nigripes* is presently known from Coolamon in N.S.W. to Mareeba in north Queensland. This beetle is much more widespread than noted by Hawkeswood (1992) but remains a poorly collected species.

Discussion

The larvae and adults of *L. nigripes* and the larvae of *T. onycha* feed on a range of cycads. Despite the diversity in Australian hosts (Table 1), there has been no apparent specialization of the beetle or the butterfly with respect to the different Australian cycads, although experimental testing of the host preferences of the subspecies of *T. onycha* would be of interest. In north-eastern New Guinea, the beetle *Lilioceris clarkii* Baly feeds on young fronds of *Cycas schumanniana* (given as *C. papuana*) in the Markham Valley (Szent-Ivany *et al.* 1956), but other species of *Lilioceris* use monocotyledonous plants as hosts (Monteith 1991, Hawkeswood 1992). There is general consensus that *Cycas* (Cycadaceae) is more distantly related to the other cycad genera and families than they are to one another (Caputo *et al.* 1991, 1993), hence it is intriguing that these two insects are able to utilise such a broad range of not only species, but genera and families.

Acknowledgments

Permits were provided by the Queensland Forest Service (QFS) and the Forestry Commission of N.S.W. The cited institutions allowed access to the collections in their care. G. Daniels (UQIC) and M. de Baar (QFS) assisted with specimen identification and literature. M.S. Moulds (AM) provided locality data on *L. nigripes* in N.S.W. Various aspects of this work were discussed with D.L. Jones and G. Wilson.

References

CAPUTO, P., STEVENSON, D.W. and WURTZEL, E.T. 1991. A phylogenetic analysis of American Zamiaceae (Cycadales) using chloroplast DNA restriction fragment length polymorphisms. *Brittonia* **43:** 135-145.

CAPUTO, P., MARQUIS, C., WURTZEL, T., STEVENSON, D.W. and WURTZEL, E.T. 1993. Molecular biology in cycad systematics. Pp. 213-219 in Stevenson, D.W. and Norstog, K.J. (eds.), *Proceedings of CYCAD 90, the Second International Conference on Cycad Biology.* Palm & Cycad Societies of Australia Ltd., Milton.

COMMON, I.F.B. and WATERHOUSE, D.F. 1981. *Butterflies of Australia.* Pp. xiv. + 682. Angus and Robertson, Sydney.

DUNN, K.L. and DUNN, L.E. 1991. *Review of Australian butterflies: distribution, life history and taxonomy.* Privately published by the authors.

FORSTER, P.I. 1994. Cycadaceae, Zamiaceae. Pp. 344-345 in Henderson, R.J.F. (ed.), *Queensland Vascular Plants: Names and Distribution.* Queensland Department of Environment & Heritage, Brisbane.

HAWKESWOOD, T.J. 1992. Notes on the biology and host plants of the Australian leaf beetle *Lilioceris* (*Crioceris*) *nigripes* (Fabricius) (Coleoptera: Chrysomelidae). *Entomologist* **111:** 210-212.

JONES, D.L. 1993. *Cycads of the World.* Reed Books: Sydney.

MONTEITH, G.B. 1991. Corrections to published information on *Johannica gemellata* (Westwood) and other Chrysomelidae (Coleoptera). *Victorian Entomologist* **21:** 147-154.

SIBATANI, A. and GRUND, R.B. 1978. A revision of the *Theclinesthes onycha* complex (Lepidoptera: Lycaenidae). *Transactions of the Lepidopterological Society of Japan* **29:** 1-34.

STEVENSON, D.W. 1992. A formal classification of the extant cycads. *Brittonia* **44:** 220-223.

SZENT-IVANY, J.J.H., WOMERSLEY, J.S. and ARDLEY, J.H. 1956. Some insects of *Cycas* in New Guinea. *Papua and New Guinea Agricultural Journal* **11:** 53-56.

WILSON, G. 1993. The relationship between *Cycas ophiolitica* K. Hill (Cycadaceae) and the butterfly *Theclinesthes onycha* (Lycaenidae), the beetle *Lilioceris nigripes* (Chrysomelidae: Criocerinae) and the ant *Iridiomyrmex purpureus.* Pp. 53-57 in Dekkers, A. *et al.* (eds), *Proceedings of the 1993 Postgraduate Student Association Symposium held at the University of Central Queensland.* University of Central Queensland, Rockhampton.